

Why Do Some Community College Students Use Institutional Resources Differently Than Others in Program Selection and Planning?

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Abstract

A growing number of institutions undertaking “guided pathways” reforms are rethinking how students select programs of study, choose courses, and make other program-related choices. One primary aim is to help students make thoughtful decisions about their programs early on as a means to encourage faster and more satisfying college completion. The City Colleges of Chicago (CCC) has been undertaking a guided pathways reform effort for several years. Based largely on student interviews, this paper describes how degree-seeking students at CCC make choices about their programs in their first year of enrollment, focusing especially on how they interact with advisors and how they use college-based resources in program selection and program planning. We find that the complex process of program selection and planning is undertaken differently by students with greater or lesser tolerance for ambiguity, and that inconsistent or conflicting information about program details is particularly frustrating for some students. We recommend that institutions engaging in guided pathways reform efforts clarify advising processes and materials to reduce contradictory information and confusion.

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1. Introduction

Building on research suggesting that the use of clearly defined curricular pathways and integrated guidance and counseling services (Cho & Karp, 2013; Jaggars, Jacobs, Little, & Frega, 2012; Karp, 2011; Karp et al., 2012; O’Gara, Karp, & Hughes, 2009) may lead to increased rates of student success (Jenkins & Cho, 2012; Moore & Shulock, 2011; Scott-Clayton, 2011), higher education institutions are redesigning academic programs and support services to create more coherence and structure. They are mapping out ideal curricular offerings for their programs of study, better integrating advising and student supports, and deliberating on and defining intended learning outcomes across programs (not just within courses). These “guided pathways” reforms are intended to help students choose and stay on a clear path toward the completion of a well-conceived program of study (Bailey, Jaggars, & Jenkins, 2015). The reforms encourage thoughtful major selection and program planning by each student early in a student’s academic career and thus rely on the ability of each student’s assigned academic advisor to help each student make well-informed decisions.

A student’s path through a program of study is the cumulative result of multiple decisions, including the choice of a specific academic major, the choice of a transfer destination (for a community college student seeking a bachelor’s degree), and the term-by-term selection of courses. Together, these program-related decisions help the student to achieve academic, transfer, and career goals. Importantly, although the series of decisions concerning program selection and academic planning may have long-term impacts on how much a student earns and what type of job he or she secures after graduation (Altonji, Kahn, & Speer, 2014; Arcidiacono, 2004; Black, Sanders, & Taylor, 2003), little is known about the decision-making process, especially within the community college context. Students rightfully want to choose a program of study in which they can excel and feel fulfilled, and can gain the skills required to be successful in the job they wish to obtain after graduation. Students bring to college and to this decision varying experiences, aptitudes, and preferences that may make them better suited for certain majors or careers than others (Gelblum, 2014; Horn & Zahn, 2001; Yuen, 2010). A student’s ability to identify and make judgements about these experiences and

characteristics is a critical step in ensuring that he or she selects—and completes—a suitable program of study (Bailey, Jenkins, Belfield, & Kopko, 2016). The current research on student success has not adequately considered how students can be best helped to identify both their academic and career interests and abilities, select an appropriate program of study, and make other program-related decisions.

This paper contributes to the literature by investigating how associate-degree-seeking students make multiple decisions about their programs (such as choice of major and course selection and sequencing) during their first year, using student interview data collected at the City Colleges of Chicago (CCC). Institutional reform efforts recently undertaken at CCC provide a fertile context for this study, as the institution was one of the first to reform the program-of-study selection and planning process, with the aim of helping students select majors earlier on and more systematically and to stay on track to completion. Our study aims to answer two related research questions: (1) What institution-based resources (including meetings with advisors, the college website/student online portal, and printed materials) do students use during the program selection and planning process? and (2) What explains differential interactions with advisors and institution-based resources during the decision-making process? To examine these questions, we employ the concept of “ambiguity tolerance” to understand how students might respond differently to unfamiliar and complex situations.

2. Background: CCC Guided Program Pathways to Success Reform

CCC plays a critical role in serving students from communities often excluded from higher education by providing opportunities for social and economic mobility. The community college system provides learning opportunities for Chicago residents at seven colleges and seven satellite campuses throughout the city. Over 70 percent of CCC students are African American or Hispanic, and the majority of students are from low-income families. Over 90 percent of students entering CCC from the Chicago Public Schools require remediation in math or English. Historically, CCC’s graduation rates have been very low. In 2009, for example, the system’s three-year graduation rate was only 7 percent, though it has since increased to 17 percent.

Beginning in 2010 CCC began a radical overhaul, known as the “Reinvention,” designed to improve degree attainment and labor market success for the system’s more than 100,000 students. A central thrust of this strategy has been to create more clearly structured programmatic pathways aligned with requirements for success in careers and further education, and to integrate these pathways with advising and supports to help students enter and complete a program of study as quickly as possible (CCC, 2014, p. 11). Starting in fall 2014, all degree-seeking students were required to choose one of ten “focus areas” (known more generally in the guided pathways literature as meta-majors) upon entry, each aligned with a major area of occupational demand in Chicago, and to develop and follow an individualized plan for completing a program of study based on program maps that outline a semester-by-semester default sequence of courses for students to follow from first term to completion.

In order to develop its program maps, CCC reorganized its college-level programs into the student Guided Pathways to Success (GPS) system in an attempt to improve program alignment with employer and transfer school needs. As part of the GPS reform, CCC streamlined information and created materials, including semester-by-semester course sequence maps, designated critical program courses, and specific milestones toward completion for each degree program and focus area to help students throughout the program-related decision-making process. By clarifying program requirements and expectations and making programs easier to understand through the guided pathways approach, CCC hoped to reduce the burden on advising and enable advisors to monitor students’ progress on their individualized, customized plans informed by the default program maps.

Within this context, CCC students ideally select and begin a program of study early on with the aid of institution-based resources, including an advisor and GPS materials. Students who are undecided or who have trouble selecting a program of study are encouraged to meet with an advisor as soon as possible to discuss and narrow program alternatives, often through the use of career assessments. To aid in the selection process, both decided and undecided students are required to meet with an advisor during their first semester of enrollment, and are provided a range of standardized materials introducing GPS, program/major and available degree/focus area alternatives, and course

options. Resources include the program maps and an online portal where students can access information about curriculum requirements and track their academic progress toward completion, as well as other career- and transfer-oriented resources.

The goal of these tools and of related modifications in advising and program structure is to help students select a program of study that is appealing to them and to help them stay on track to completion. Thus, it matters how students interact with the information provided to them through printed materials, the website, and college advisors. Whether or not they are able to use the tools and resources effectively and how they interact with their advisors is key for refining the resources and student-advisor relationships and for helping other colleges design resources that can help their students navigate the process of choosing a major and engage in wise program planning.

3. Literature on Program Selection

Efforts like guided pathways reforms assume that students who are well-supported can make well-informed and rational decisions about their programs of study as early as initial intake. Under these circumstances students are encouraged to make decisions about their major as early as possible, preferably within the first year. However, there is not a strong body of evidence on which to base efforts aimed at helping students choose a major and plan an appropriate program of study for their individual academic, transfer, and career aspirations.

Although research has paid little attention to how students specifically choose a program of study and engage in course planning, a good deal of research has examined the relationship between ascribed student characteristics and major choice. Male students and students from higher SES families, for example, have been found to be more likely to enter into more lucrative technical fields of study (e.g., STEM fields), while female and lower SES students tend toward less technical majors associated with lower-paying careers (Davies & Guppy, 1997; Daymont & Andrisani, 1984; Loury, 1997; Maple & Stage, 1991). Another strand of related research highlights the importance of personality and political orientation in predicting choice of major (Pike, 2006; Porter & Umbach, 2006). And many studies have shown that ability is important in explaining student

sorting across majors (Astin, 1993; Fiorito & Dauffenbach, 1982; Sells, 1973; Simpson, 2001; Turner & Bowen, 1999).¹

However, an emergent body of literature suggests that a student's process in selecting a major and a student's course-taking behavior are influenced by more than these observable differences and that settling on a chosen major is not a single or one-time decision. Rather, there is preliminary evidence that program-related decisions are explained by ongoing learning processes wherein beliefs, preferences, and goals are constantly revised through experiences and interactions with new information over time (Arcidiacono, 2004; Logaj & Polanec, 2011; Wiswall & Zafar, 2013; Stinebrickner & Stinebrickner, 2011; Zafar, 2009). This concept of a longitudinal program-selection process suggests that student intent is not fixed but rather changes over the course of a student's entire academic experience. The prevailing theory concerning choice of major among social scientists is that course performance and college experiences continually provide students with new information, which students use to home in on an appropriate program that matches their interests, preferences, and abilities. This process might therefore result in the switching of majors, particularly among students who selected into a major prior to accumulating adequate information or experience upon which to base their decision.

Recent research highlights the temporal nature and importance of information gathering within dynamic decision-making. For example, Stinebrickner and Stinebrickner (2011) have presented evidence to suggest that while, on average, students are as open to majoring in math or science as they are to majoring in any other field when they enter college, the probability of majoring in either subject changes as academic ability reveals itself through course performance during each student's first year of study. In another study on the determinants of choice of major, Wiswall and Zafar (2013) utilized an experimental design to test whether new information affected students' beliefs and perceived probabilities of graduating with a certain major and found that students revised their beliefs in response to information about employment opportunities and expected earnings.

¹ These types of studies are often more methodologically challenging due to debates surrounding appropriate and valid measurement strategies.

With ongoing experience as a student, however, comes an increased risk of inconsistent information and information overload. Accumulation of more information than one can manage, information that is not easily understood, or information not connected to prior knowledge can thwart the process or lead to sub-optimal decision-making (Fukukura, Ferguson, & Fujita, 2013). A student's ability to process new information over time plays an important role in the decision-making process (Chen, Pedersen, & Murphy, 2012). New college students may be underprepared to select their majors, yet student decision-making can also be hindered later on by an inability to digest new knowledge or sort through inconsistent or contradictory information over time.

While this literature implies that both too little and too much information can be disadvantageous, it provides little insight into how best to guide students in major selection and other program-related decisions. Few studies explore why or how students process the information they receive before and during their postsecondary careers, and little attention has been paid in the literature to how students interact with information about programs of study gained over time.

Its longitudinal nature is not the only facet of the decision-making process that demands more attention. A 2009 survey of entering community college students found that while most were able to meet with an advisor who helped them to set their first-term schedules, almost a third said they were not encouraged to set goals or create a plan for achieving those goals (Center for Community College Student Engagement, 2010). In fact, in a comprehensive review of the literature on the nature of advising and student interactions, Karp (2013) found that advisors might not adequately consider differential needs or interests of students. Instead, advising is often focused on providing students with information that may not address each student's individual needs or aspirations. The importance of the student-major match necessitates a better understanding of how students interact with and utilize available resources during the decision-making process in order to determine how advisors can best facilitate and guide students throughout the program-selection process.

In addition, what has been written on major choice has mostly neglected community colleges, focusing instead on the four-year sector (Bailey et al., 2016). These findings may not be applicable to community college students, given differences in

student characteristics and academic outcomes among students at two- and four-year schools. Understanding how community college students select a program is important because of the relatively lower levels of academic preparation found among community college students (Dowd, 2007), which may mean that they may be particularly susceptible to student–major mismatches, may move through the program selection process at a different rate, or may need more information and guidance to make good decisions.

Finally, it should be noted that the “structure” hypothesis, which underlies Chicago’s GPS reform efforts and other guided pathways reform efforts, posits that early program selection among more coherent programs of study will enable students to make their decisions more efficiently. However, critics of guided pathways reform efforts argue that the guided pathways model may be too prescriptive and may not provide enough time for career or major exploration necessary for students to make well-informed and goal-appropriate choices (see Rose, 2016), especially since community college students often have limited knowledge of and access to resources. Understanding how to guide students’ program-related decisions within a community college guided pathways context is therefore critical to ensuring that these reforms do not lead to unintended negative consequences. Current research is not entirely useful in determining which information and supports are most useful to students as they engage in academic decision-making, thus motivating the current study.

4. Theoretical Framework

To better understand how students make program-related decisions, we apply two theoretical perspectives. First, we draw from Bandura’s (1977) seminal work on social cognitive theory to focus our attention on the context in which people learn and act on their learning. This perspective posits that the decision-making process is a form of learning and that it is a dynamic social process dependent on continual feedback rather than one influenced primarily by static individual characteristics. Social cognitive theory can help untangle the complex set of both internal characteristics and external

relationships that influence program selection and other program-related decisions on the part of students.

Some core concepts of social cognitive theory include self-efficacy and self-regulated learning. Self-efficacy beliefs describe individuals' confidence for engaging in specific activities that lead to the fulfillment of goals (Bandura, 1977). For students, self-efficacy beliefs help students establish and meet short- and long-term goals during the processes of completing college and pursuing their careers. Self-regulated learning describes the process in which learners take control of and responsibility for their individual learning (Bandura, 1977, 1986). In socially mediated action learning, individuals face a problem or task, and within the context of interaction with a learning coach or group, engage in reflective inquiry, action, and learning (Marquardt & Waddill, 2004). Compared with research that relies on binary characterizations of decision-making, conceptualizing major selection as a socially mediated learning process enables us to examine differential use of information and advising over time and to consider how individuals digest and respond to information to determine a course of action.

Erich and Russ-Eft (2011) applied these concepts within the context of advising, arguing that advising is a developmental learning process for the student, not merely transactional. Ideally, advisors can support students in the process of selecting their programs of study and can help reinforce a student's confidence and self-efficacy in program selection. While Erlich and Russ-Eft described resources and techniques advisors used to support student self-regulated learning, they did not describe which sources of information were most useful in helping students during the program selection process, nor did they describe how students interacted with these materials when making choice-of-program decisions.

In its focus on complex individual and social learning, social cognitive theory does not fully consider how individuals make decisions when processes and situations are unclear. Thus, we employ a second concept, "ambiguity tolerance," originally developed by Frenkel-Brunswick (1949) within the field of psychology, and widely applied within various disciplines (Furnham & Marks, 2013). Ambiguity tolerance describes an individual's ability to perceive and respond to unfamiliar and complex situations (Xu & Tracey, 2014). Low ambiguity tolerance is characterized by having an adverse reaction to

ambiguous situations, while individuals with high ambiguity tolerance perceive ambiguous situations as challenging and are more willing to take risks. For example, an individual with low ambiguity tolerance may encounter a situation, such as encountering contradictory information, and express anxiety or confusion that leaves the individual unable to make a decision. An individual with high ambiguity tolerance, on the other hand, might encounter the same contradictory information and actively seek ways to find or substantiate accurate information.

Xu and Tracey's (2014) multidimensional model of career indecision combines decision-making theory with the concept of ambiguity tolerance (cf. Gati, Krausz, & Osipow, 1996), suggesting that an individual's decisions are partially influenced by his or her characteristics and preferences and in particular by how an individual deals with uncertainty. When there is an overabundance of program options, inconsistent information about programs, and a lack of guidance to orient students, students encounter informational uncertainty. Xu and Tracey (2014) found a relationship between ambiguity tolerance and how an individual manages and resolves confusing, inconsistent, or contradictory information. Their study also found a relationship between ambiguity tolerance and self-efficacy.

In this paper, we examine how community college students select program pathways, including a specific major and set of courses, and the interpersonal and material resources that they rely on as they make program-related decisions in their first year of study. Although out-of-school resources and interactions certainly influence students, this paper focuses exclusively on school-based materials and interactions with advisors. We build on the current literature by focusing on choice of major as a multi-dimensional process rather than as a single decision determined by preexisting characteristics. We apply the concept of ambiguity tolerance to help understand why students may be more or less hesitant to select a program, and how they approach new information and the decision-making process.

5. Methods

Our sample is drawn from four of the seven colleges of the CCC system. Locating the study in a single system enables us to isolate individuals’ experiences from potentially confounding differences in advising processes. At the same time, collecting data from four colleges helps ensure that students’ institutional contexts are representative of the system as a whole.²

Interview data were collected over the course of two rounds of site visits, which occurred during the spring 2015 and fall 2015 semesters. We interviewed degree-seeking students who were 18 years of age or older and had first enrolled at CCC between the fall 2014 and fall 2015 semesters, such that students were enrolled in one of their first two terms when the interview took place. An outreach email was sent by college personnel at CCC to recruit students in both rounds of the study.³ Our final sample includes 132 students who were eligible to participate in the study. Table 1 presents the final sample distribution across colleges.

Table 1
Number of Students Interviewed per College

CCC College ^a	Rounded Total ^b	Number Interviewed in Spring 2015	Number Interviewed in Fall 2015	Total Number of Students Interviewed at Each Institution
Evergreen Community College	< 10,000	15	19	34
Oak Community College	< 10,000	14	14	28
Birch Community College	10,000–20,000	12	21	33
Redwood Community College	10,000–20,000	12	25	37
Total	Over 20,000	53	79	132

^a College names are pseudonyms.

^b Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data (IPEDS), 2014–2015 Final Release; numbers have been rounded to preserve site anonymity.

² Table A1 in the Appendix summarizes institutional characteristics of participating colleges.

³ During the second site visit, we also conducted snowball sampling and utilized an outreach flyer to supplement recruitment efforts.

We used a life-history approach (Atkinson, 2007), using a semi-structured interview protocol that asked first-year students to chronologically describe their intake and advising experiences and their decision-making process around major selection, beginning prior to college enrollment. We used the life-history approach to allow students to describe their experiences and provide context to the multiple moments in their life that helped shape their decision-making around college attendance, program selection, and academic planning including course scheduling. Our research questions and protocol were partially informed by how the guided pathways reform efforts aimed to get degree-seeking CCC students to select a focus area and ideally a specific major or pathway during the intake and admission process. We were especially interested in learning about whether first-year students are able to make deliberate, confident decisions about their program of study early on during the initial orientation and registration process as well as during subsequent meetings with advisors; and most importantly, we wanted to know if and how students are able to make these choices in an informed and timely way. Specifically, we prompted students to discuss their decision to attend college and then asked how and why they selected their program of study and how they engaged in course planning. We also asked students about their experiences with college advising, including about their individual experiences with their assigned advisor.

The interviews lasted approximately one hour and were audio-recorded and transcribed. Prior to the interviews, students were also asked to complete written surveys, which included questions on basic demographic and academic information as well as questions about their confidence in their selection of a focus area and/or specific major, that is, about the extent to which they felt that they liked what they chose, felt comfortable with it, thought it was a good fit in terms of their academic strengths, and matched their career interests.

Following the first set of visits, we created a coding scheme based on our research questions, the interview protocol, and initial impressions about possible themes. For example, one theme emerging from data collection (and ultimately explored in this paper) related to students' use of information resources. Thus, we coded responses to questions about experiences with advisors and other school-based resources, major selection, and program of study planning. We also coded for challenges using resources (such as when

information was insufficient or confusing) and suggestions to improve resources. We paid particular attention to these suggestions because, at the student level, they imply that a student is able to internalize and process challenges and identify alternative routes for success. Our code list was also informed by the aforementioned theoretical frameworks. Specifically, we created multiple codes that described students' "choosing a program of study" or "changing a major/program of study" to help us better understand the internal processes by which students make program selections.

We coded all transcripts using Dedoose. Inter-rater reliability was established using Dedoose's "training center" function⁴ and ongoing coding reviews by the project lead. After every fifth transcript, a member of our research team reviewed the transcript for coding consistency, engaging in a back-and-forth norming discussion with others when there was disagreement. We also reviewed, discussed, and resolved coding inconsistencies at regular team meetings.

In addition to coding individual excerpts, full transcripts were used to judge a student's level of ambiguity tolerance. Importantly, we decided against having students self-rate their level of ambiguity tolerance using a survey or some other instrument in order to avoid a pre-constructed narrative of how ambiguity tolerance might manifest in an educational setting. Instead we opted to have members of the research team make holistic, deductive assessments of an overall ambiguity tolerance level based on patterns of ambiguity tolerance within the transcript. The freedom associated with semi-structured interviews permitted students to fully reflect on instances of confusion and allowed us to unpack students' nuanced reactions to moments of ambiguity described within personal narratives. This ensured a more comprehensive evaluation of ambiguity tolerance among students.

Although there is no single agreed upon measure for rating the level of ambiguity tolerance, several scales have been introduced to measure how subjects might respond to ambiguous situations (Block & Block, 1951; Budner, 1962; McLain, 2009). Using these tools as a reference, we developed a set of criteria by which to judge a student's level of ambiguity tolerance. Specifically, for each student in our sample we reviewed their

⁴ Training Center is a feature of Dedoose designed to improve inter-rater reliability for code applications. For more information, see <http://www.dedoose.com/userguide/interraterreliability/trainingcenterarticle>.

transcript to determine whether each of the below statements was true or false. Those students for whom the statements were true or mostly true were assigned as having low ambiguity tolerance, while those students for whom the statements were false or mostly false were labeled as having high ambiguity tolerance. Students whose transcripts did not adequately reveal tendencies toward the behaviors listed below were not given any ranking:

- Student perceives new situations as threatening.
- A lack of information causes the student discomfort.
- Student experiences stress when faced with inconsistent or contradictory information.
- Student makes an effort to avoid confusing or unfamiliar situations.
- Student expresses excessive worry or anxiety about the future.

Recall that our interviews took a life-history approach and included the description of life experiences and events related to decisions other than choice of major. Students were asked about their decisions to attend college, selection among CCC campuses and colleges, and selection of courses, among other things. Therefore, our assessment of ambiguity tolerance is a global one, based on multiple opportunities to confront confusion or uncertainty and not specifically focused on the major selection process itself.

After coding the transcripts, we analyzed our data using Dedoose's analytics charts feature, including using its co-occurrence chart, descriptor and code count chart, and descriptor plus descriptor plus code chart to review the transcripts. We were interested in code applications of ambiguity tolerance, which were weighted, as well any code applications discussing sources of influence for students' selection of program of study, students' experiences choosing a program of study and their process, and student experiences with assigned and non-assigned advisors. We used survey data, which was uploaded and linked to Dedoose transcripts, in order to analyze descriptive information about student program choice and conduct a subgroup analysis of individual student-level data according to student demographics. After reviewing the code applications using the

Dedoose charts, we inductively looked for themes related to student ambiguity tolerance and program selection.

Table 2 provides self-reported sample demographics for the entire sample and shows researcher-rated levels of ambiguity tolerance for particular groups. Given our small sample, these descriptive characteristics are not generalizable. However, they may be helpful in explaining how students differentially respond to college experiences, particularly in relation to interactions with school-based resources and advising.

Table 2
Student Demographics and Levels of Ambiguity Tolerance

	Gender		Age					
	Male	Female	< 21 years old	21–40 years old	41+ years old	Missing		
Percent of Sample	39	61	65	28	7	1		
Percent Within Group by Level of Ambiguity Tolerance								
High (%)	33	24	38	35	13	100		
Some	33	43	29	32	50	0		
Low	21	25	17	22	13	0		
NA	14	9	17	11	25	0		
	Race/Ethnicity					Intent to Transfer		
	Hispanic /Latino	Black, non-Hispanic	White, non-Hispanic	Asian or Pacific Islander	Multiple	Intend to Transfer	Do Not Intend to Transfer	Missing
Percent of Sample	41	34	15	5	5	89	8	3
Percent Within Group by Level of Ambiguity Tolerance								
High	26	27	30	33	29	28	10	50
Some	37	36	45	33	57	37	60	25
Low	32	22	15	17	0	25	10	0
NA	6	16	10	17	14	9	20	25

Note: Column totals may sum to more or less than 100% due to rounding.

Our descriptive data offers a demographic picture of our respondents. As expected based on national averages of college participation, the majority of our sample is female and younger than 21 years of age. Typical of community college students nationally, more than 80 percent relayed the intent to eventually transfer to a four-year institution (Horn & Skomsvold, 2011, Table I-A). Students in the sample ($n = 132$) are also more likely to be non-White, with the majority of respondents self-identifying as Hispanic/Latino or Black.

We also compared our student descriptive data with our ambiguity tolerance scale results to see if there are any discernable differences across particular populations. Subgroup analyses reveal some interesting patterns across the sample. Hispanic/Latino students, for example, are rated as more likely than their counterparts to have low ambiguity tolerance, while White and Asian/Pacific Islander students are more frequently rated as having high ambiguity tolerance.⁵ Women in our sample are nearly 10 percentage points less likely than men to have high levels of ambiguity tolerance. Students in the youngest age group are most likely to have high levels of ambiguity tolerance, while the oldest students in the sample are least likely to be rated this way. While we caution against the generalizability of these associations, they do suggest that students in some groups may, on average, experience situations and respond to them in different ways. Because the current research seeks to further understand the potential role of ambiguity tolerance to explain observed differences across students, we excluded students who we were unable to place along the continuum for the remaining analysis presented here, resulting in a final analytic sample of 118 students.

⁵ Importantly, many of the students we interviewed revealed that they were first-generation college students, and several came from households headed by immigrants to the United States. Unfortunately, our data does not capture parental education, immigrant status, socioeconomic status, or other attributes that are typically found to be correlated with lower levels of social and cultural capital necessary to successfully navigate college processes; these may have helped to explain why certain groups, on average, exhibited different levels of ambiguity tolerance.

6. Findings

Life-history narratives resulting from our research as well as prior literature on decision-making suggest that program selection can be best understood as an ongoing social learning process. In other words, program selection and planning is not fixed but rather continually influenced by new information and sources of influence over time. In our study, students had various opinions about the usefulness of the institutional resources and the advising relationships they encountered during their first year of study. Student discussions of program-related decisions confirmed that students were typically exposed to the same or similar school-based resources, but the ways students experienced, interpreted, reacted to, and ultimately used those resources differed across students. Our analysis focuses on understanding this differential use using an ambiguity tolerance framework. We focus on how students differed in their use of the available resources, particularly when students encountered information that appeared to be contradictory, incomplete, or unclear.

6.1 What Do Students Think About Available Resources and Advisor Relationships?

In general, we found that first-year students were exposed to and utilized similar school-based resources during the program selection and planning process. The list of resources mentioned by students was long and varied and included some GPS-specific resources. The most popular school-based resources utilized during the program selection and planning process within the first year of college enrollment included program maps, Smart Planner (CCC's course planning software available on the student online portal), course catalogs, transfer guides, and the CCC website. Students also frequently discussed both academic and career advising sessions. Students explained in detail how these resources were used and how they interacted with them, including how their use may have changed over time.

While students engaged with similar resources, we found that students had differing opinions on the usefulness of each, particularly with respect to GPS-related materials such as program maps or computer-based resources such as Smart Planner. Some students found these materials extremely helpful and enjoyed knowing the exact

requirements they needed to fulfill in order to complete their degrees. One student said: “They just updated the system so it makes it a little easier to pick classes. You can see what classes you need to graduate, how close you are to graduation. I thought that was pretty cool...” Meanwhile, other students questioned the usefulness and accuracy of GPS materials, opting instead to rely on self-directed research and alternate sources of information such as the experiences and suggestions of peers. One student said: “Like everything changes. ... I was just misinformed in a lot of those ways [by the program maps], and I would have been really behind schedule if I hadn’t been my own self-advocate.” In other words, although students encountered the same or similar resources, they varied significantly in how they reacted to and used those materials, even when students were enrolled in the same program or major.

Among the many resources available and discussed, students often focused on their experiences with advising at their college. As with other resources available to students, access to and opinions about advising varied, in large part due to varied access to and structure of this resource. Some students continued to meet with the same advisor over the course of their first year of college enrollment, and they used this relationship to build the self-efficacy skills needed to make a satisfying program selection decision. Although long-term advising represents the GPS ideal and was the student–advisor relationship most often described by students, some students lacked continued access to a single advisor due to difficulty setting up meetings with their assigned advisor, advisor turnover, or simply because they did not know who their assigned advisor was, and as a result frequently relied on “drop in” or ad hoc advising. These students described advising as inconsistent in quality and limited in its ability to provide them with meaningful discussions surrounding program planning. As one student put it, “All the walk-ins are different, and all the advisors you talk to are different...” Students also discussed feeling “rushed” in some advising sessions, which often occurred during peak registration periods or in in-group advising contexts.

Importantly, students’ individual experiences with advising were not necessarily correlated with their ability to either choose a major or develop a program of study more quickly, and we heard different opinions even when referring to the same type of advising structure within the same college. For example, one college’s orientation

advising session was described as both “really helpful” and “really frustrating” by two different students. Interestingly, at the time of the interviews, both students were equally unsure about their particular academic goals and had not yet decided on a program of study. Similarly, two students who had access to assigned advisors who took a developmental approach, a process of academic advising based on close student–advisor relationships, interpreted those relationships differently. One student who described a mentoring relationship with her advisor, for example, explained that her confidence in specific program-related decisions, and course selections in particular, could be at least partially explained by her advisor’s efforts to “try to bring [my] spirit up” through encouragement and motivating words when she was confused or frustrated. Yet another student who had an advising relationship characterized by similarly high levels of rapport was much less enthusiastic about making any program decisions. When asked about decision-making, she said, “I’m not fully ... yeah, I’m not so good at figuring these things.” When the same student was asked if she had discussed with the advisor her lack of certainty about her academic plans or her confusions over program selection processes and materials, the student responded “No, not yet.”

6.2 How Do Students’ Interactions With Resources Vary Across Time?

Engagement with institutional resources occurred at multiple times and through multiple types of interactions. First-year students were exposed to resources and information through assigned advisors, college success course faculty members, and student support services provided by transfer or career centers, highlighting the importance of social interactions that create continual feedback and learning opportunities throughout the decision-making process.

While we observed few differences in students’ awareness of different types of resources over time, we did find differences in how those resources were used. For example, while students relied more heavily on information gained from the CCC website or other resources (such as the website ratemyprofessors.com) during their time in high school and prior to the start of college classes, students interacted more frequently with GPS materials such as program maps during initial registration and orientation. After their first term, and as students progressed further into their academic careers,

however, many students became increasingly reliant on transfer materials and course lists.

Students responded to new information in a variety of ways. Importantly, in many cases new resources provided information that contradicted or were inconsistent with previously relied upon resources. Some students recognized contradictory information, made efforts to verify accuracy, and revised their program-related decisions according to their updated or improved knowledge. One student, for example, explained his decision to dismiss his original education plan after learning what he needed to take in order to be accepted at his preferred transfer destination: “She [the advisor] has a chart for it. A sheet of paper for it, it’s a chart she tells me to look at, but I don’t really look at it a lot. I just know how many credits I need to get to pass. And how many credits and the class and the credits I need to get to go to SIUC.” This student was able to filter through advisor recommendations, GPS program maps, and transfer institution course requirements in order to assess which courses permitted him to achieve his individual goals at CCC and simultaneously prepare him to successfully transfer to his chosen four-year institution.

It is important to recognize that newly encountered resources created the ongoing need for interpretation and assessment of information. And indeed some students responded to new information with confusion. These students often avoided acting on any of the new information due to uncertainty. One student, for instance, learned that toward the end of his first semester there were three types of associate degrees (Associate of Arts, Associate of Science, and Associate of Applied Science), and that the applied science degree was a “more general type of degree ... with less jobs.” Despite being disappointed in his original choice for type of associate degree, the student decided to remain in his original degree program because he was still unsure which type of degree was best for him and did not want to “waste time.”

Students reacted in different ways to new pieces of information as they navigated their way through program planning. Students’ also varied in their ability to integrate new information. In many cases the new information replaced previously relied upon knowledge to shape and refine program-related choices; in other cases, however, students were thwarted by new or contradictory information, which resulted in inaction.

6.3 Ambiguity Tolerance: Explaining Interactions With and Perceptions of Resources

Given students' wide range of experiences with school-based resources and the dynamic nature of decision-making, what explains observed differences in how students interact with resources? As noted, much of the current literature on program selection focuses on identifying what subgroups of students choose what kinds of majors, but the literature does not typically identify differences in how or why students use materials and information to choose a program of study.

One might reasonably predict that students with better access to higher quality resources or advisor interactions will have an easier time deciding on a major or will be more confident in the major they select. However, as discussed above, students sometimes offered opposing opinions and perceptions about program selection and planning despite having similar access to similar school-based resources. Our findings, therefore, suggest that the quality of materials and advising alone is *not sufficient* in understanding a student's ability to navigate the decision-making process over time. Given the relationship between ambiguity tolerance and decision-making uncovered in the literature, we apply the framework to our earlier finding regarding inconsistent use and opinions of various information resources.

Low ambiguity tolerance. In general, the lower a student's tolerance for ambiguous situations, the less likely they were to (1) acknowledge information inconsistencies and (2) attempt to rectify the inconsistent or contradictory information. Indeed, extreme reliance on direction from others appears to have led many students with less ambiguity tolerance to take the advice of advisors despite having a different assessment of a given situation. For example, one student described feeling conflicted about wanting her advisor to select her classes and nonetheless believing that the classes the advisor chose were not the best for her: "I didn't know exactly what I wanted to go for. So I kind of let him do that. But he ended up putting me in similar classes that I really wasn't interested in. So I kind of didn't do a good job in that class. So it kind of messed up my GPA." Despite recognizing that her advisor may not have selected the classes she felt were most suitable, an over-reliance on her advisor to direct her pathway through college resulted in unsatisfactory consequences.

Another slightly more proactive student found multiple visits to an advisor frustrating rather than useful. Unsure how to select a program area, the student said he “went back [to my advisor] a few times, which was really frustrating.... He just printed out a sheet.” While the student sought help in a general way, he did not seek further insight about how to best use the information obtained during the advising sessions despite remaining confused and frustrated by his experiences. This tendency to accept seemingly elusive materials without questioning or complaint, and the failure of students to seek additional guidance when things remain unclear—despite the fact that many of them described a high level of confusion or remarked on the brevity of the conversations with advisors—is highly characteristic of students with low ambiguity tolerance. Students with lower levels of ambiguity tolerance did not find access to multiple information sources particularly useful, but rather frequently became frustrated or overwhelmed as a result.

In essence, students with lower ambiguity tolerance were more likely to rely on others, especially advisors, to deal with uncertainty when faced with contradictory information. These students expressed the desire to have advisors play a larger role in the major selection process and program planning and were less likely to question the advisor’s recommendations. A student rated as having low ambiguity tolerance, for example, explained that he was frustrated by his advisor’s unwillingness to research transfer institutions that would allow him to pursue his selected major: “She felt that I had to do it myself.” Similarly, a student who was unsure about what she wanted to do talked about how an advisor made program decisions for her during registration: “I was down for anything. She was like, ‘Why don’t we just make this?’ And she brought out the schedule. She was like filling things in. And I was like, ‘Perfect.’” Uncomfortable with not knowing which program she wanted to select, she accepted the first suggestion given by the advisor.

Overall, students with lower levels of ambiguity tolerance tended to speak very favorably of GPS program maps and educational planning, citing a preference for clear-cut directions and reliable materials, particularly at intake where students are asked to make a program selection while simultaneously navigating a new set of institutional expectations and an unfamiliar environment. This corroborates findings from other

studies on students' perceptions of GPS materials (Fink, 2017), which indicate that students find the materials to be useful.

High ambiguity tolerance. Students displaying higher levels of ambiguity tolerance, on the other hand, were more likely to engage positively with multiple resources. They sought to balance interaction and information with their own opinions and knowledge, often finding the process of doing so interesting or useful. These students were more likely to self-advocate, challenge advisor's recommendations, especially those that were contrary to their own expectations or beliefs, and seek out self-identified resources that they felt more adequately informed their program selection decision.

Greater ambiguity tolerance was associated with an increased likelihood to assume responsibility for seeking out resources that would inform their choices. One student stated, "I knew [the classes] didn't fit what I want to do. ... I don't know if [other students] want to blame an advisor or they want to blame themselves, but I just—I got to be accountable for what [I] do." Even though the student was frustrated with an advisor's initial advice about what program might be good for him to pursue, he repeatedly sought out other advisors to help correct perceived errors.

Students with high levels of ambiguity tolerance preferred independence and confirmed the need to take program-required courses by utilizing multiple materials and resources. They were also unlikely to become overwhelmed by materials: "It was a little more than I thought... I wouldn't say it was overwhelming, it was just, you know, it's reality time." Another student described how she responded to her dissatisfaction with the advisor's suggested course schedule: "You know what? To be honest, he gave me four classes, and two of those classes I dropped. And so me and my girlfriend, we went through the paper.... We went through the GPS and we basically figured out on my own, like ... you got to take this." Contradictory advice and information was integrated and synthesized by these students to help them make decisions.

Finally, students with greater ambiguity tolerance seemed to appreciate opportunities to build self-efficacy and ownership over the decision-making process. One student described her advising experience with assigned advisors: "She actually taught me how to do the program, sign up for my own classes. So if I couldn't make the next meeting I would just do it on my own." This student described her interaction with the

advisor as useful. It appeared to affirm her ability to independently utilize resources and increase her level of confidence in navigating the decision-making process to make appropriate choices. Students with more ambiguity tolerance were also more likely to attempt to confirm the validity of information they received from their advisors. One student who rated higher on the ambiguity tolerance scale exemplifies this finding, stating about his advisor, “I trust him, but I’m still going to go check at Northeastern to see if every class I take here is transferable.”

Summary of ambiguity tolerance findings. In our analysis, students’ ambiguity tolerance appeared to be aligned with their differential use of resources and advisors. Students with lower ambiguity tolerance relied on direction from advisors and GPS materials, regardless of whether or not the advising was supportive and the materials were accurate. Students with higher ambiguity tolerance had a more dynamic interaction with the materials and advisors, and more actively optimized their program selection and planning by seeking further verification of information or by consulting additional resources.

Table 3
Percentage of Various Types of Excerpts by Ambiguity Tolerance Rating

Ambiguity Tolerance Rating	Challenges With Advising (%)	Suggestions to Improve Advising (%)	Challenges With Program Selection (%)	Suggestions to Improve Program Selection (%)
High	25	36	21	44
Some	26	24	26	28
Low	49	40	53	28

Table 3 summarizes the distribution of excerpts made by students about advising and program selection challenges as well as suggestions to improve advising and the program selection process across students with different levels of ambiguity tolerance. Table 3 suggests, for example, that about half of all excerpts describing challenges with advising were made by students with low ambiguity tolerance, about a fourth were made by students exhibiting some ambiguity tolerance, and about a fourth were made by students with high ambiguity tolerance. When comparing challenges and suggestions for improvement to advising and program selection for each group of students, large

differentials between challenges and suggestions for improvement can be interpreted as evidence of how well students exhibiting a given level of ambiguity tolerance were able to cope with and overcome difficulties, such as informational inconsistencies or disagreements with advisors, in order to successfully navigate program selection. Students rated as having low ambiguity tolerance described challenges with both advising and program selection about twice as frequently as students rated as having either some or high levels of ambiguity tolerance. And the same students were less likely to offer suggestions on how to rectify challenges. The opposite holds true for students with higher ambiguity tolerance; that is, students with high levels of ambiguity tolerance more frequently expressed ways to overcome institutional barriers related to advising and program selection, despite being the least likely to mention challenges overall. Table 3 supports the idea that ambiguity tolerance can be used to help understand why students might differ in how they use resources in program-related decision-making.

7. Discussion and Conclusion

Given the dynamic nature of decision-making, we looked in this study for descriptions of students' learning and of them modifying their views, feelings, or understandings about their choice of major and other program-related decisions in their interview responses. The use of an ambiguity tolerance framework helps explain the complex process by which students make decisions about their programs of study and provides for a more nuanced understanding about why students differentially experience and utilize similar school-based resources during the program-of-study decision-making process.⁶ Indeed the framework may be helpful for assessing how advising can be tailored to make it more useful for students.

Our findings indicate that students with high levels of ambiguity tolerance use multiple resources to inform them during the program selection and planning process. For

⁶ Although family, peers, and other out-of-school resources and interactions certainly have some influence over program choice, we focused our analysis on understanding how school-based materials and interactions are experienced by students in order to better understand how institutions can best aid in the decision-making process.

these students, advising that helps a student critically assess information and think strategically about associated course-taking would be helpful and would further encourage confidence and self-efficacy. We find that those students with less ambiguity tolerance rely on advisors and advisor-provided materials (rather than other school-based resources and materials) to make selections about their programs of study. Our findings suggest that students with lower levels of ambiguity tolerance, like their more ambiguity-tolerant peers, also benefit from developmental advising that encourages student self-efficacy, but that these students require extra support as they build confidence about their decision-making. Access to clear materials and resources, as well as the holding of multiple advising sessions with the same assigned advisor over the first year would benefit such students in their program selection process.

Our study was carried out at CCC after the college system had been engaged in GPS reforms for some time. Our findings may thus have implications for institutions that are engaging in guided pathways reform efforts. Keeping in mind that choice-of-major is often a difficult high-stakes decision for which much information and ideas about education, career, and aspirations are considered, institutions should eliminate inconsistencies in the information provided in institutional resources before these are shared with students to reduce confusion or ambiguity. For example, information about course offerings on registration websites should be consistent with information published in guidebooks, and program maps and should be up-to-date.

An underlying assumption of the guided pathways model is that students are able to take advantage of clearly presented information in order to select an area of academic and career interest early in their college experience. Our findings indicate that information may not be as clear as what colleges would like and that institutions should thus consider that students are involved in a complicated and taxing process of digesting knowledge, regardless of the intended or perceived clarity of that information. While administrators may be inclined to believe that increased access to information early on may be lead to better and more informed decisions, a student must be able to successfully utilize the information that is presented to them. When information is not clear or when it contradicts what students believe or understand to be true, the decision-making process

becomes more complicated and stressful, particularly for students with low ambiguity tolerance.

In order to best serve students, when sharing resources, practitioners (particularly advisors) should be aware that program-related decision-making may differ for students according to their individual capacity to navigate unfamiliar and at times confusing experiences. For example, students with less ambiguity tolerance may be more willing to heed the advice of an advisor, without thoroughly considering the impact that that advice might have on his or her future. These are students who are the most likely to become overwhelmed with having greater and at times contradictory information, and they may therefore take a path which may not be ideal given their needs and aspirations. Administrators and advisors should be cognizant of this possibility and work to ensure that students understand the implications of their choices.

These findings support active advising models aimed at identifying and facilitating progress in the academic pathway best suited to each student's individual needs and goals. It follows that institutions implementing guided pathways should think carefully about how advising interventions are structured, especially as students may require differentiated advising not only according to the specific program they have chosen and their longer term academic and career goals but also according to personal attributes such as their degree of ambiguity tolerance. Developmental advising strategies that complement a more complete understanding of the individual student will likely be more beneficial than more prescriptive models focused primarily on delivering academic information and institutional resources. Colleges may want to consider specific ways advisors can better understand students' personalities in order to identify advising interactions that best serve each individual student. Assessments of ambiguity tolerance and other personality attributes are available through a variety of written surveys or could be undertaken using cognitive interviews (Furnham & Ribchester, 1995; McShane & Von Glinow, 2009); these could even be built into students' initial advising sessions.

Some students appreciate the support advisors provide in navigating complex institutional processes, and many find the substantial use of individual education plans during initial advising sessions extremely useful. Yet advising sessions should also address students' self-efficacy and their level of confidence in their program choices.

Knowing more about the personality attributes of particular students could be useful in helping students sort through their interests, abilities, and goals. For low-ambiguity-tolerant students, for example, this might focus on building students' skills to help synthesize information wisely; for high-ambiguity-tolerant students, this might emphasize building confidence and providing additional information for program refinement. In both cases, advising that is sustained, proactive, and personalized and that takes a developmental approach can best meet these goals.

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Appendix

**Table A1
Institutional Characteristics**

CCC College ^a	Total Enrollment	Overall Graduation Rates ^b	Student Race/Ethnicity
Evergreen Community College	< 10,000	13%	74% Hispanic/Latino, 17% Black 5% White 4% Other
Oak Community College	< 10,000	9%	69% Black 16% Hispanic/Latino 6% White 5% Asian 4% Other
Birch Community College	10,000-20,000	14%	40% Hispanic Latino 24% Black 20% White 13% Asian 3% Other
Redwood Community College	10,000-20,000	15%	59% Hispanic 22% White 8% Black 6% Asian 3% Other

Note. Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data (IPEDS), 2014–2015 Final Release.

^a College names are pseudonyms.

^b 150 percent time-to-graduation.